Memorandum

To: *Diane Salkie, EPA Region 2*
Elizabeth Franklin, USACE

From: *Troy Gallagher, CDM Smith*
Keegan L. Roberts, Ph.D., PE, CDM Smith

Date: *October 25, 2019*

Subject: *Summary of Oversight of SPME Sampler Installation Effort at River Mile 10.9*
September 28-30, 2019
Lower Passaic River Restoration Project

On behalf of the United States Environmental Protection Agency (EPA) and the United States Army Corps of Engineers (USACE), Kansas City District, CDM Federal Programs Corporation (CDM Smith) traveled to the River Mile (RM) 10.9 removal area on September 28, 29, and 30, 2019 and provided field technical oversight of the installation of solid-phase microextraction (SPME) samplers at 10 locations. Three samplers were installed at each of these 10 sample locations, including one each in the armor layer, the top of the reactive layer, and the underlying sediment bed. One set (one each in the armor layer, reactive layer, and underlying sediment bed) of duplicate samples were installed at one of the 10 sample locations. The approximate depth that each sampler was installed was:

- A deep sampler, installed in the underlying sediment at approximately 40 inches below the mudline (tagged with orange zip ties and orange tape for future identification)
- A mid-depth sampler, installed in the active layer at approximately 24 inches below the mudline, about 6 inches below the geotextile fabric (tagged with yellow zip ties and yellow tape for future identification)
- A shallow sampler, installed in the armor layer at approximately 16 inches below the mudline, above the geotextile fabric in the armor layer (tagged with green zip ties and green tape for future identification)

The field activities were conducted by AECOM on behalf of the Cooperating Parties Group (CPG). Prior to the previous sampler installation attempts, EPA and the CPG discussed several iterations of sample locations in an attempt to accommodate the CPG's logistical and health and safety concerns. These previously agreed-upon sample locations were again targeted during this deployment, as many of the CPG's original logistical and health and safety concerns still remained. The SPME samplers installed by AECOM are part of the performance monitoring for the RM 10.9 sediment cap. The SPME passive

porewater samplers are intended to assess contaminant concentrations in the sediment bed, in the active cap layer, and in the armor stone layer of the RM 10.9 cap. This document notes that this is the fourth deployment attempt for the performance monitoring activities. Three deployment attempts were required for the first monitoring event.

A brief summary of the work completed is as follows:

- On September 28, 2019, samplers were deployed at Stations 0606, 0607, and 0608, including a duplicate set of samplers deployed at 0606.
- On September 29, 2019, samplers were deployed at Stations 0604, 0605, 0609, and 0610.
- On September 30, 2019, samplers were deployed at Stations 0601, 0602, and 0603.

Photographs of field activities are presented in Attachment 1. A copy of the field logbook notes is provided in Attachment 2.

Summary of Saturday, September 28, 2019 Field Activities

Personnel in Attendance

Keegan Roberts – CDM Smith
Troy Gallagher – CDM Smith
Helen Jones – AECOM
Marc Smith – AECOM
Claire Murphy-Hagan – AECOM
Jennifer Reed – AECOM
Patrick Fellion – AECOM
Briley Barra – AECOM
Chrisy Puopolo - AECOM

Prior to the start of the day's field activities, Troy Gallagher and Keegan Roberts met onsite to discuss a plan for the day's activities and perform a site walk. CDM Smith and AECOM personnel met onsite and had a tailgate safety briefing. The primary safety considerations included heat stress and combined water/mud levels when working on the cap. AECOM also noted that unlike the prior event where samplers were cut after deployment, samplers would instead be cut before deployment and deployed at the correct length so approximately 6 inches of the sampler would ideally be protruding out of the sediment surface. The length of sampler extending above the sediment surface ultimately ended up varying.

AECOM generally organized their seven field personnel into three teams: two 3-person sampler deployment teams and one person to stay on shore to be able to deliver any necessary equipment. Three samplers were deployed at each sample station: one in the armor layer, one in the active layer,

and one in the underlying sediment bed. All sampler preparation and deployment activities were to be performed in accordance with the QAPP (AECOM 2015).

Sets of three samplers were installed at Stations 0606, 0607, and 0608 on September 28, 2019, including a set of duplicate samplers deployed at Station 0606. The duplicate location was selected due to ease of access from the shore and ease of deployment on the first set of three samplers. The field team was able to install samplers at all three sampling locations as the water level remained below these locations until installation was complete. All samplers were cut on shore before deployment to ensure that the length protruding out of the sediment surface was not excessive; approximately 6 inches of sampler was sticking out of the sediment surface after deployment at each location. However, at station 0608 only 2.5 inches of the underlying sediment layer sampler was visible sticking out of the sediment surface (**Photograph 5**); this should be remembered during the sampler retrieval.

Summary of Sunday, September 29, 2019 Field Activities

Personnel in Attendance

Troy Gallagher – CDM Smith
Helen Jones – AECOM
Marc Smith – AECOM
Claire Murphy-Hagan – AECOM
Jennifer Reed – AECOM
Patrick Fellion – AECOM
Briley Barra – AECOM
Chrisy Puopolo - AECOM

AECOM reiterated their site safety considerations during the daily tailgate safety briefing, and sampler installations progressed in the same manner as the previous day. AECOM installed the series of three samplers at Stations 0604, 0605, 0609, and 0610. Stations 0609 and 0610 were accessed by boat instead of wading out into the sediments as thick vegetation and fencing along the shoreline upland from the deployment locations prevent access from the shoreline.

It was noted during the sampler deployment at Station 0605 that the armor layer was particularly spotty and variable, appearing thick on some measurements and thin on others.

Summary of Monday, September 30, 2019 Field Activities

Personnel in Attendance

Troy Gallagher – CDM Smith
Helen Jones – AECOM
Marc Smith – AECOM
Claire Murphy-Hagan – AECOM
Jennifer Reed – AECOM

Patrick Fellion – AECOM
Briley Barra – AECOM
Chrisy Puopolo - AECOM

AECOM reiterated their site safety considerations during the daily tailgate safety briefing. AECOM installed the series of three samplers at Stations 0601, 0602, and 0603. The active layer and underlying sediment layer samplers that were deployed at Station 0602 were installed on a slight angle due to interference from armor stones (**Photograph 12**).

Table 1 presents the installation status at the ten sample stations for this deployment effort.

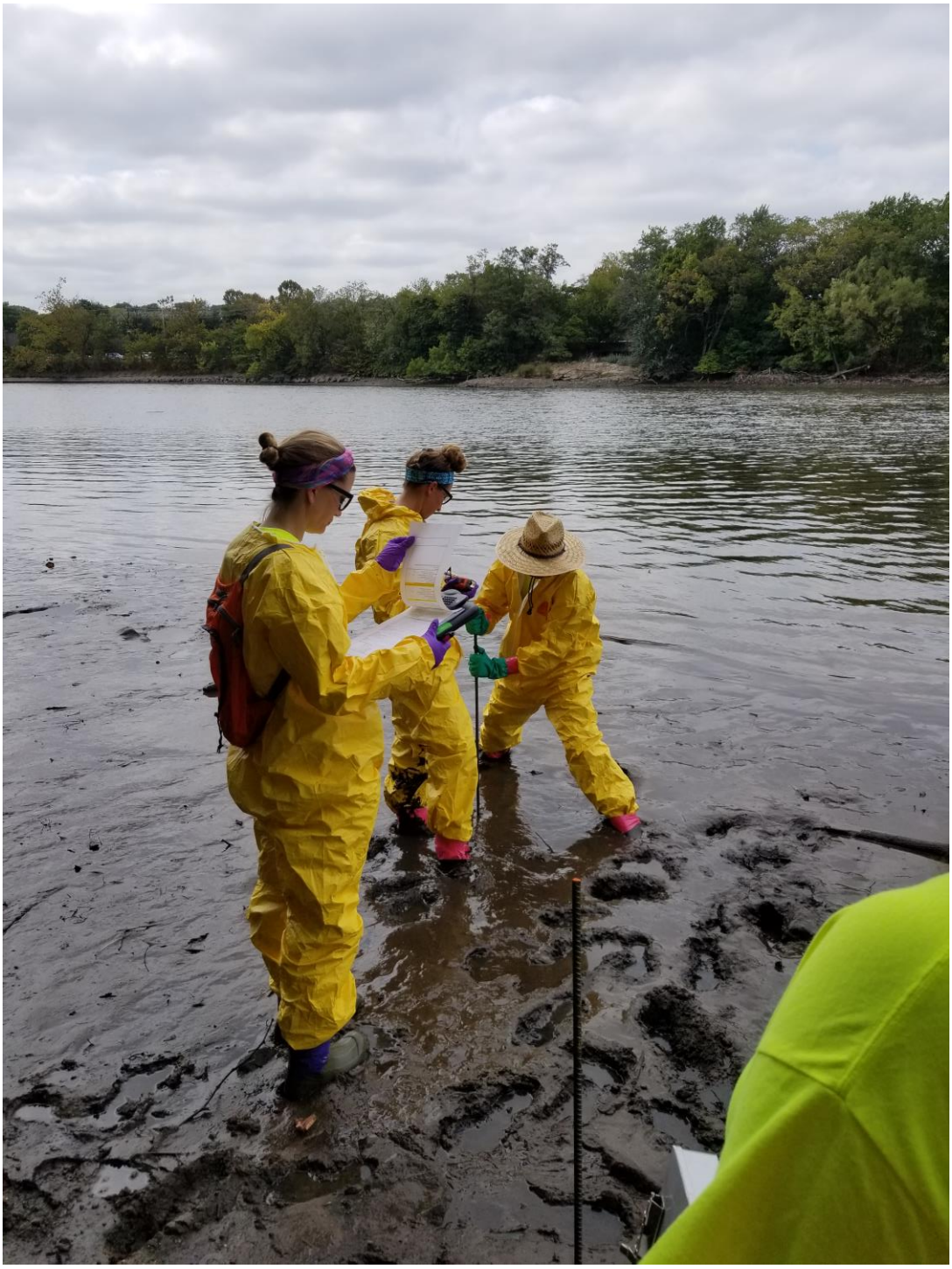
References

AECOM. 2015. Quality Assurance Project Plan, Lower Passaic River Restoration Project, River Mile 10.9 Post-Construction Monitoring – Draft. Rev. 1. December 4.

Table 1: Status of Proposed Sample Stations

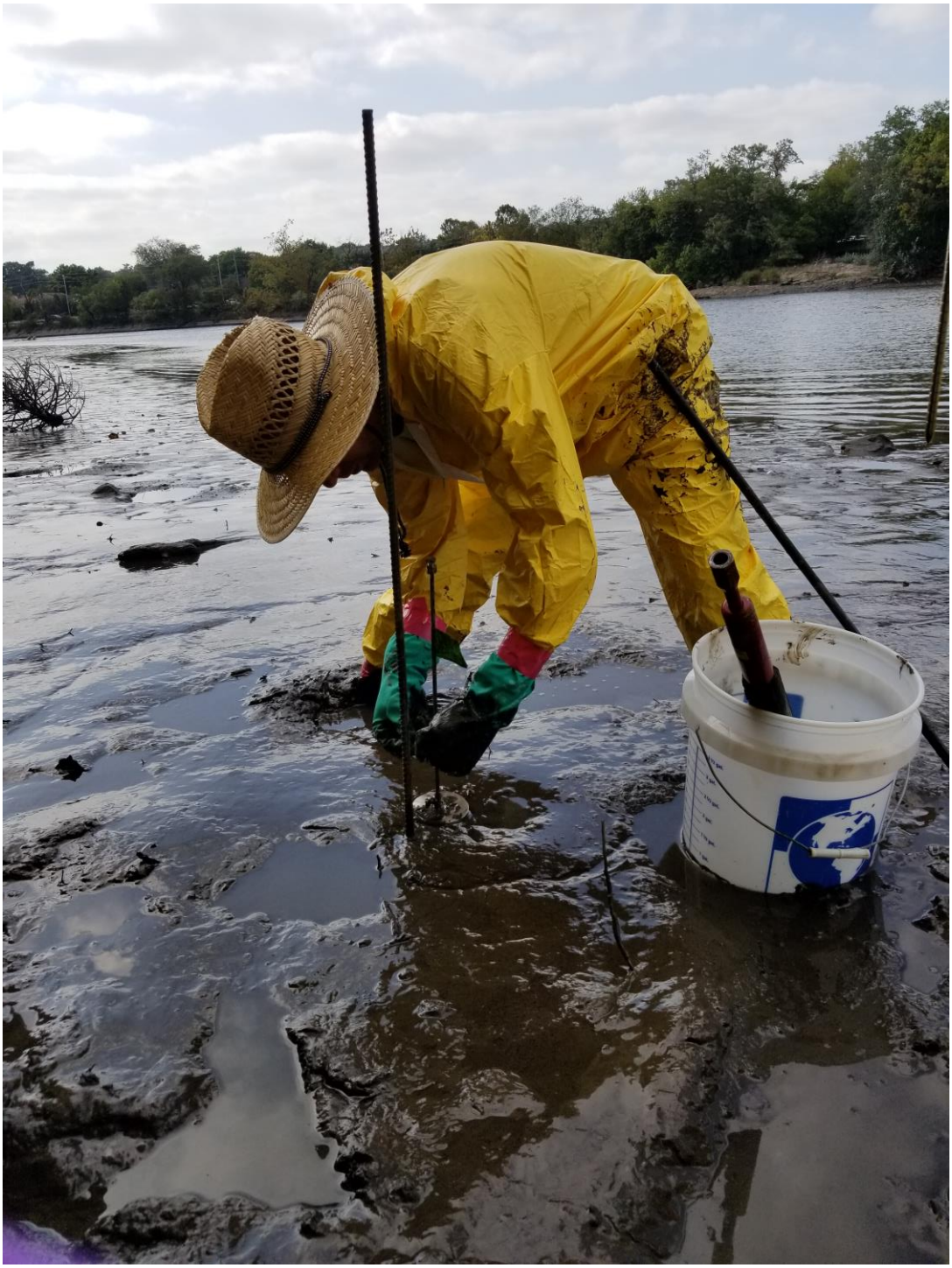
Station	Status
0601	Installation completed 9/30/2019. Sample location same as in final station location proposal.
0602	Installation completed 9/30/2019. Sample location same as in final station location proposal.
0603	Installation completed 9/30/2019. Sample location same as in final station location proposal.
0604	Installation completed 9/29/2019. Sample location same as in final station location proposal.
0605	Installation completed 9/29/2019. Sample location same as in final station location proposal.
0606	Installation completed 9/28/2019. Sample location same as in final station location proposal. Duplicate set of samplers also installed on 9/28/2019
0607	Installation completed 9/28/2019. Sample location same as in final station location proposal.
0608	Installation completed 9/28/2019. Sample location same as in final station location proposal.
0609	Installation completed 9/29/2019. Sample location same as in final station location proposal.
0610	Installation completed 9/29/2019. Sample location same as in final station location proposal.

Attachment 1
Photographs of Field Activities



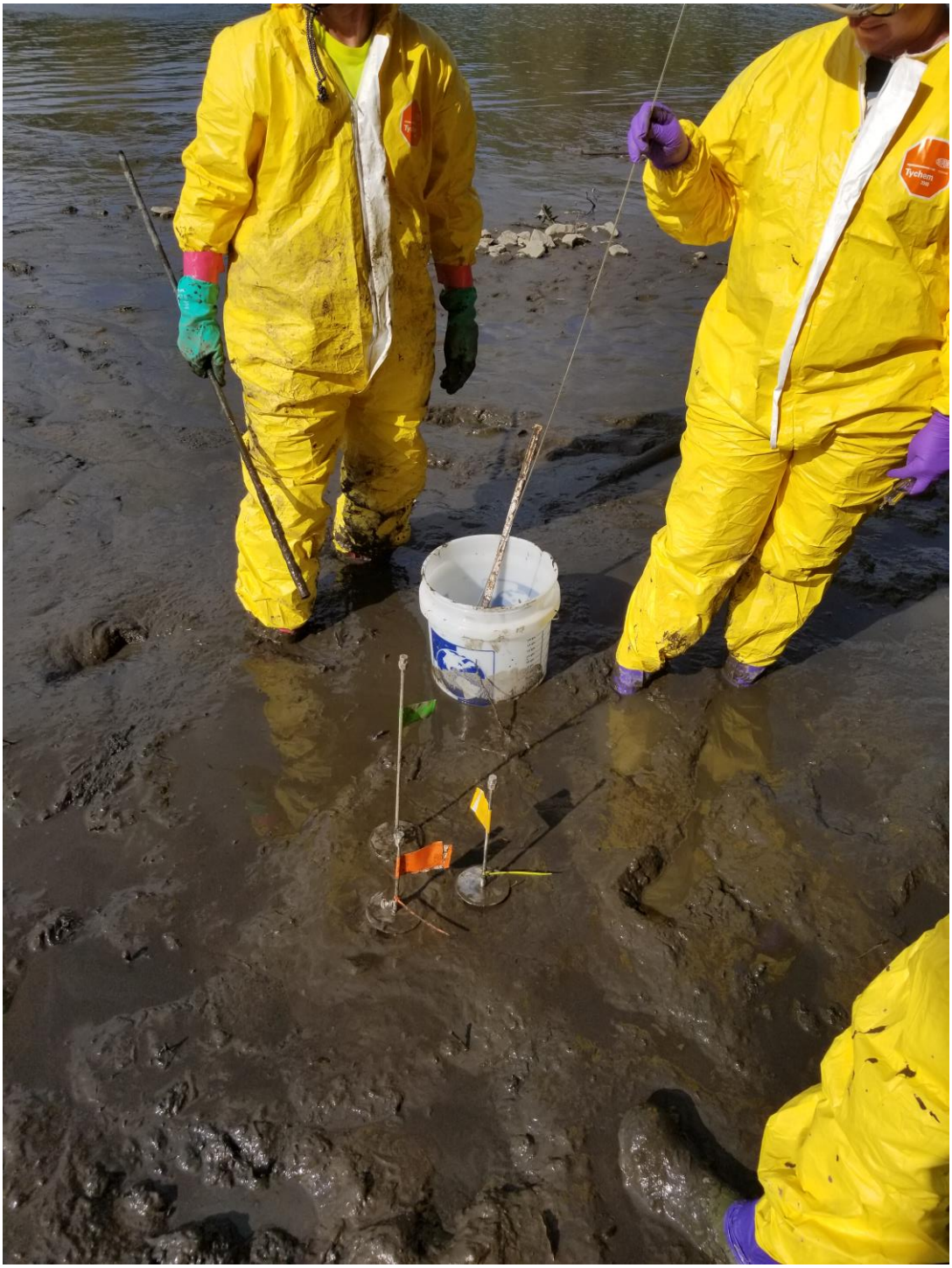
Photograph 1: AECOM taking sediment measurements at Station 0607.

9/28/2019



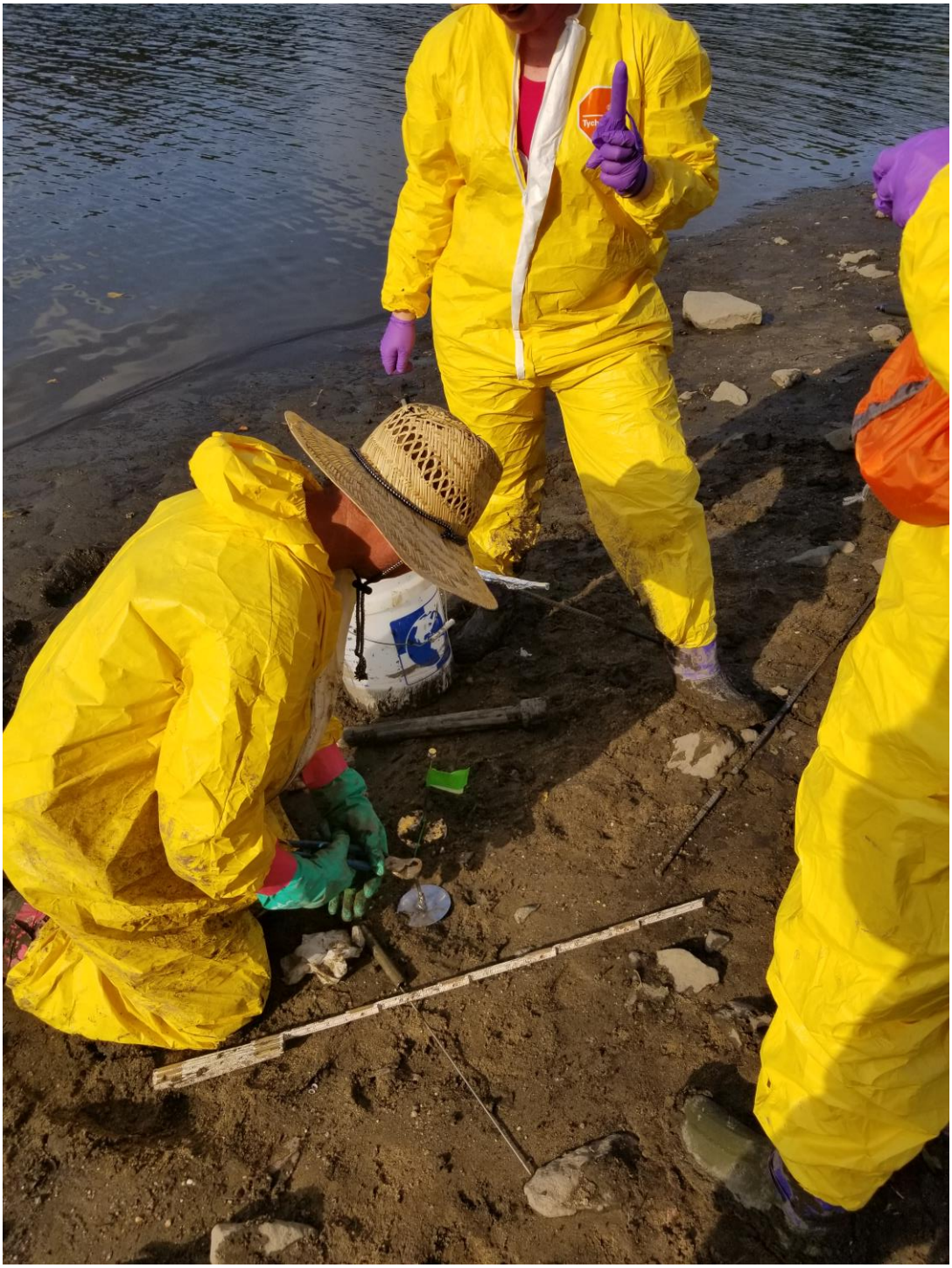
Photograph 2: AECOM attaching the cap to the top of the active layer sampler at Station 0607.

09/28/2019



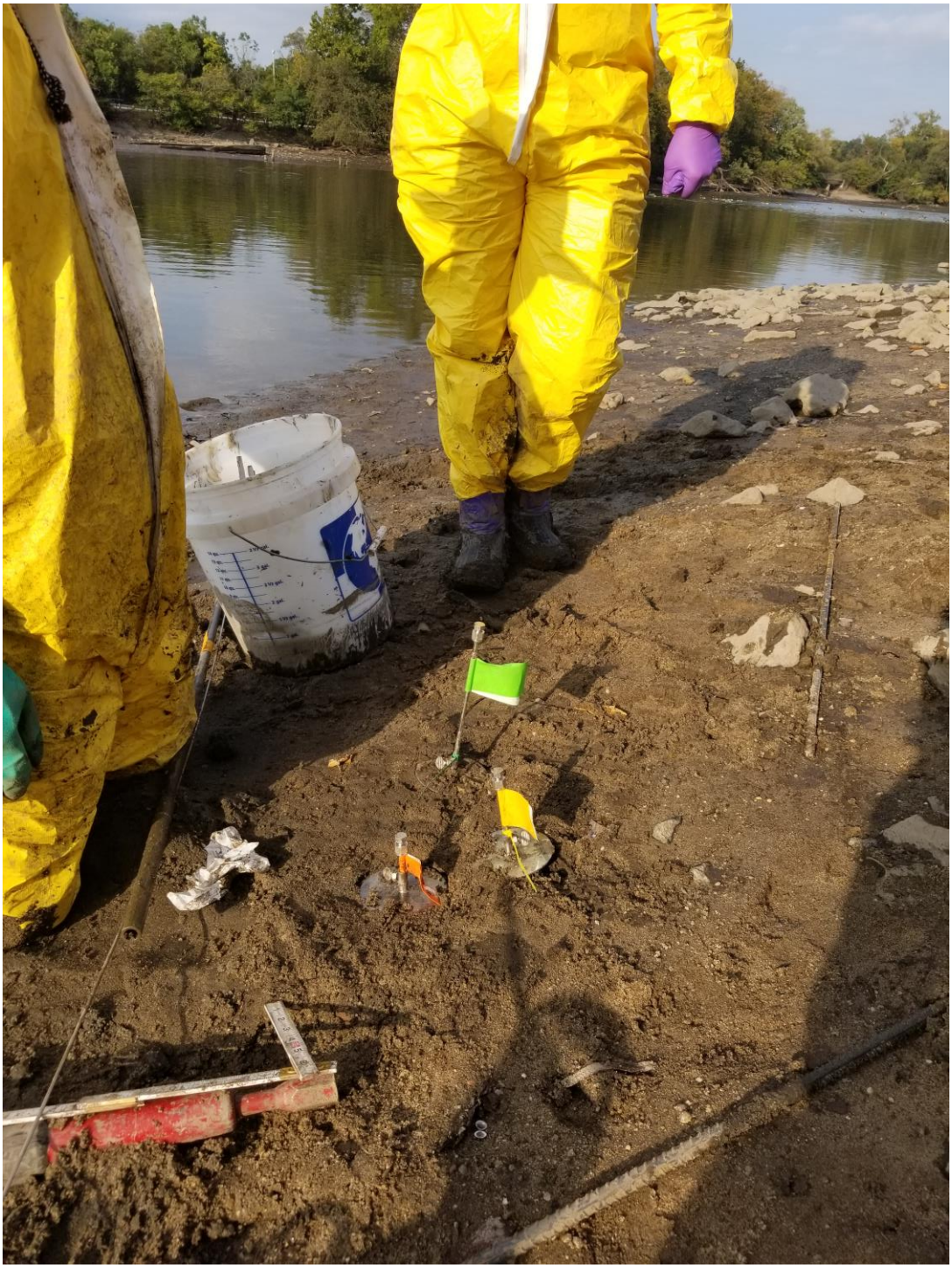
Photograph 3: Three installed samplers at Station 0607 with colored tape and zip ties for identification.

09/28/2019



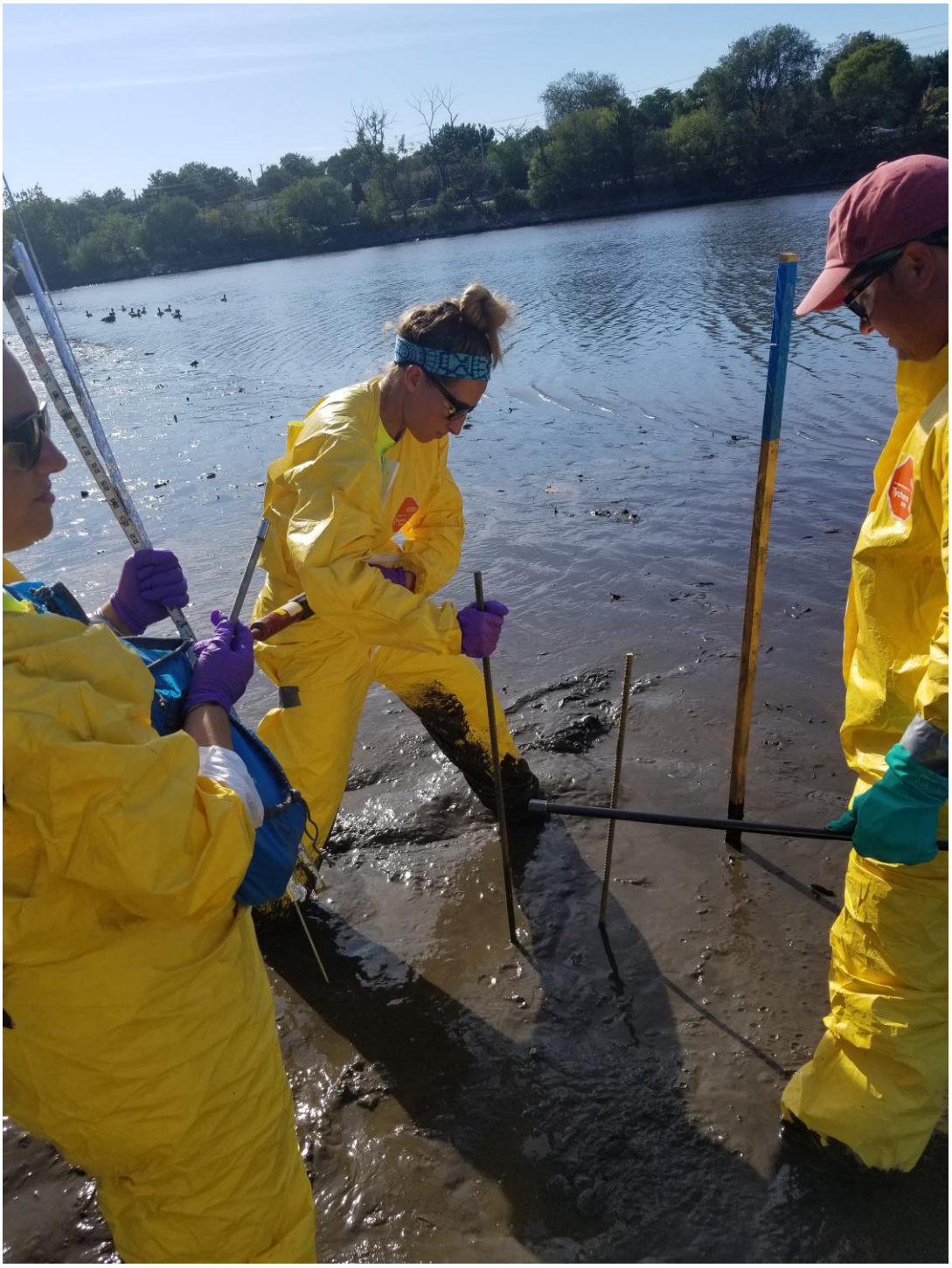
Photograph 4: Attaching the cap to the active layer sampler at Station 0608.

09/28/2019



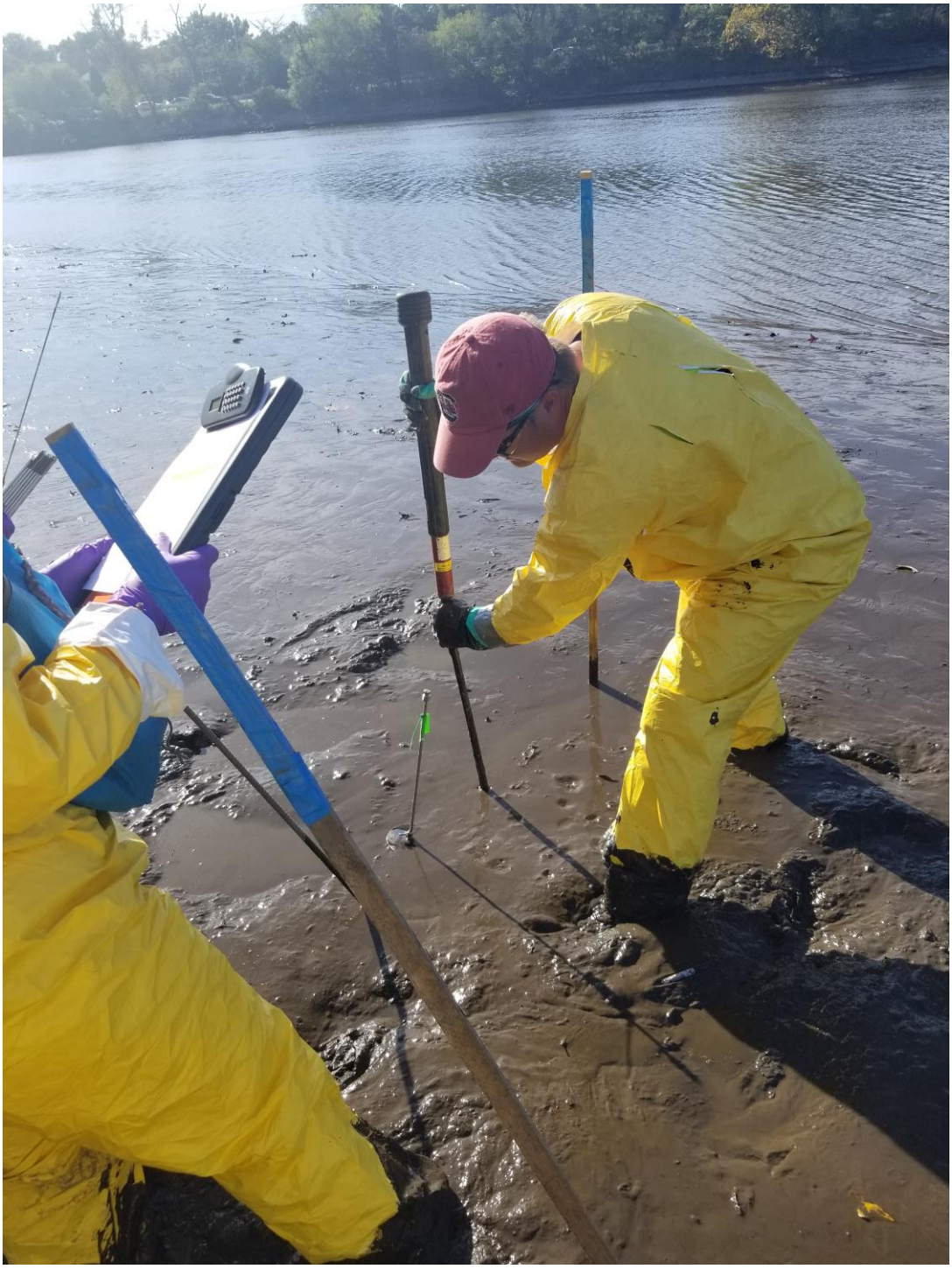
Photograph 5: Three installed samplers at Station 0608.

09/28/2019



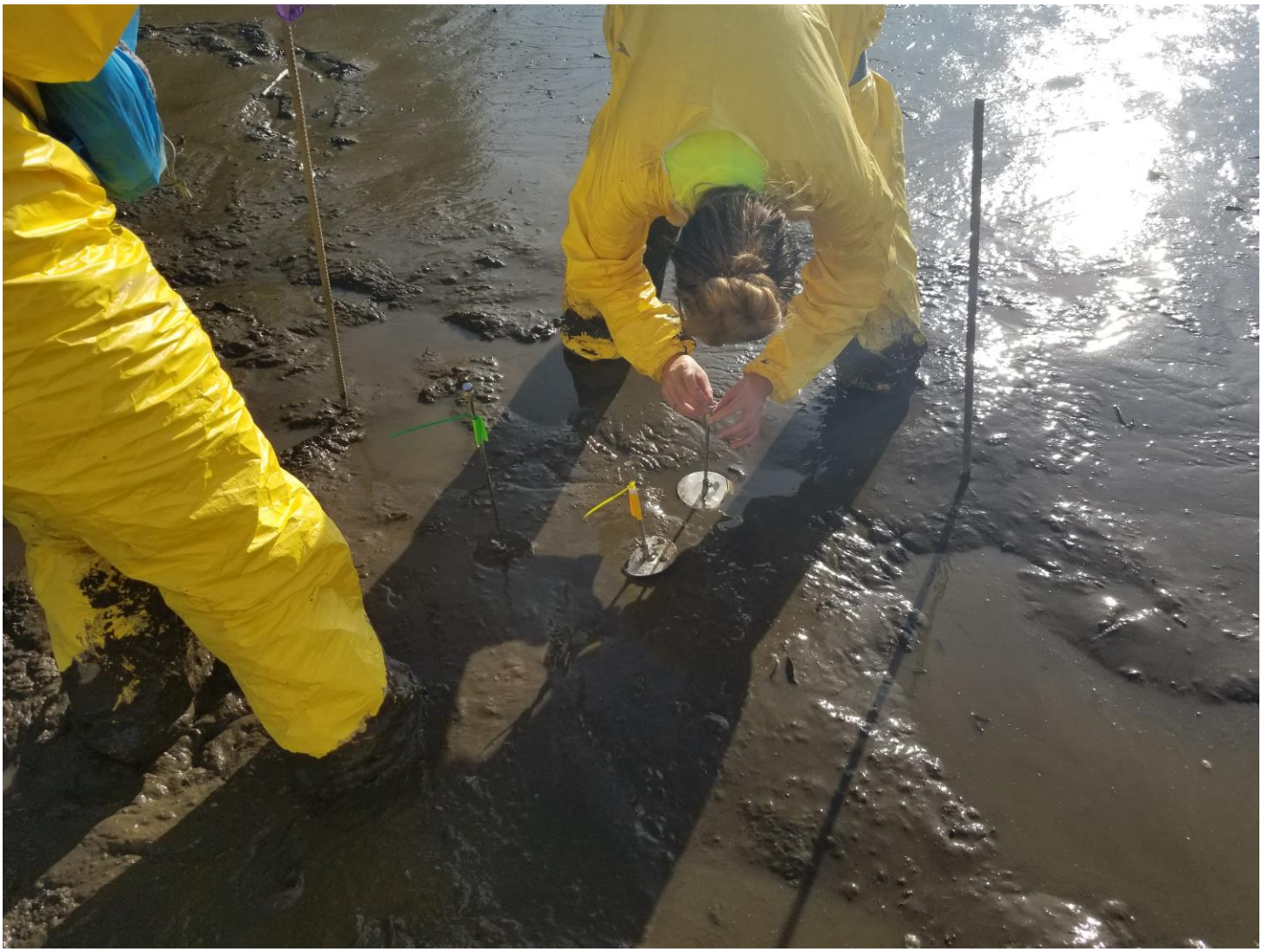
Photograph 6: AECOM taking measurements depths at Station 0605.

09/29/2019



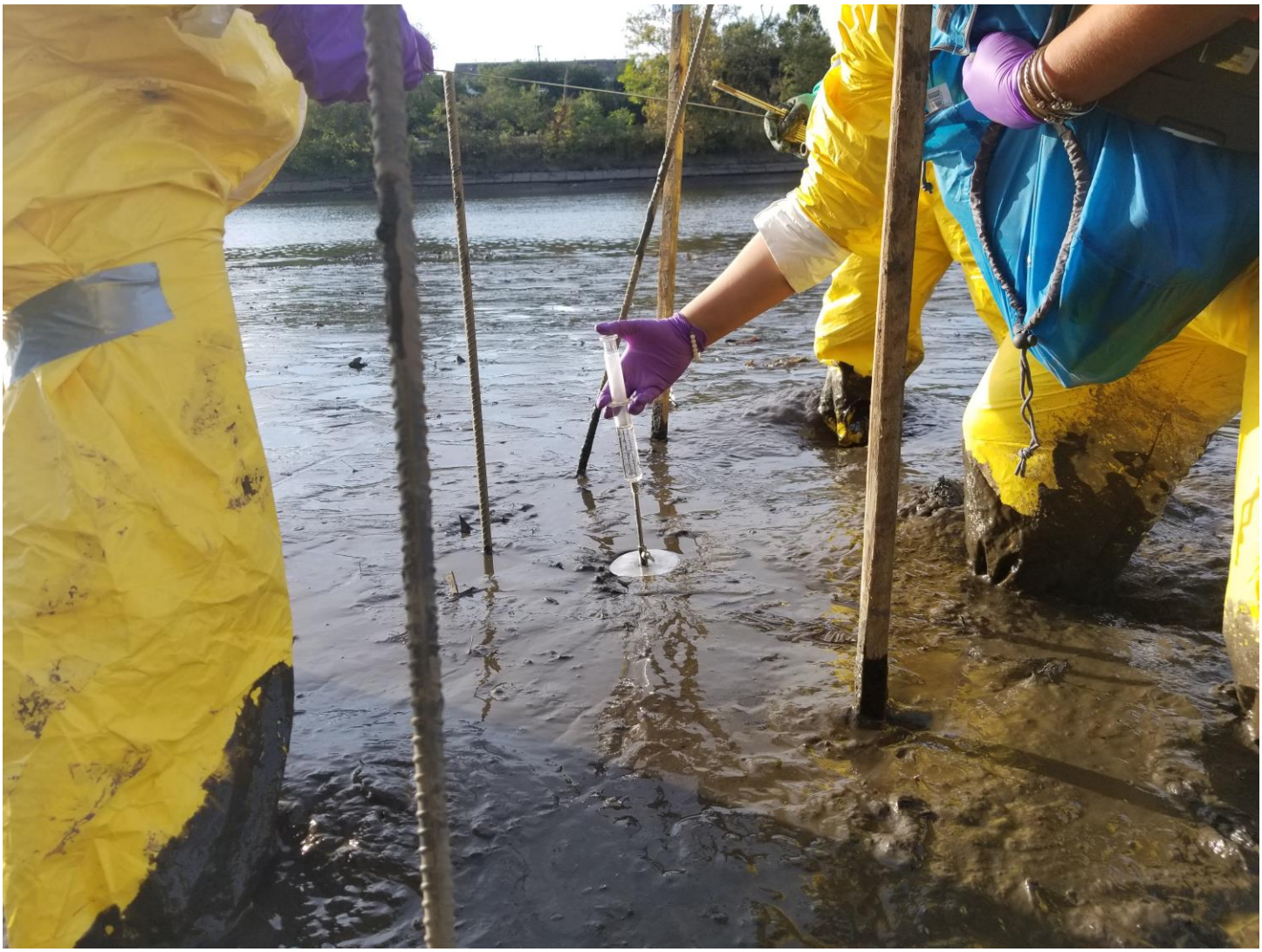
Photograph 7: AECOM using the slide hammer to drive the sampler to the correct depth at Station 0605.

09/29/2019



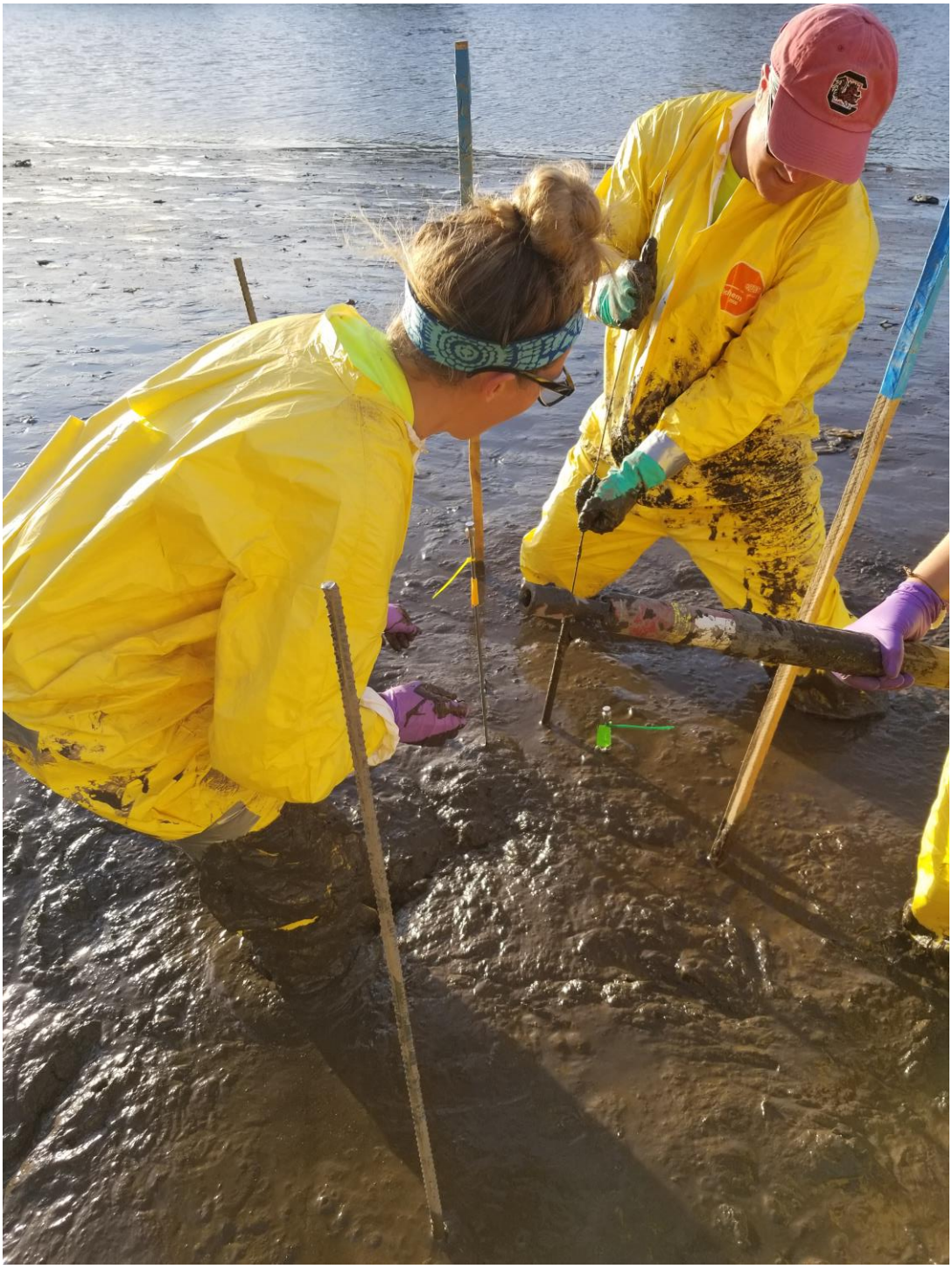
Photograph 8: Attaching the cap to the top of the underlying sediment layer sampler at Station 0605.

09/29/2019



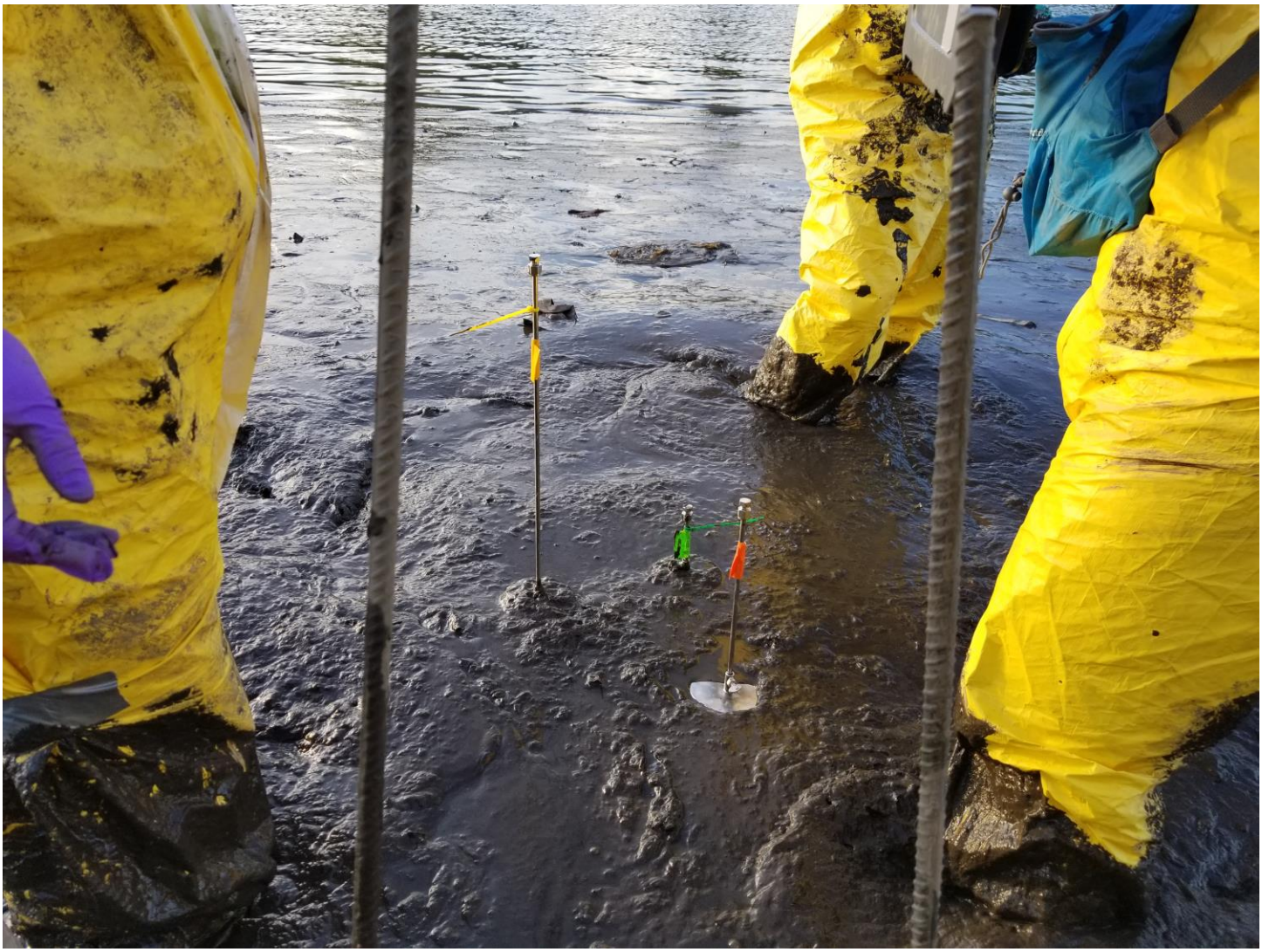
Photograph 9: Using the syringe to add deionized water to the armor layer sampler at Station 0604.

09/29/2019



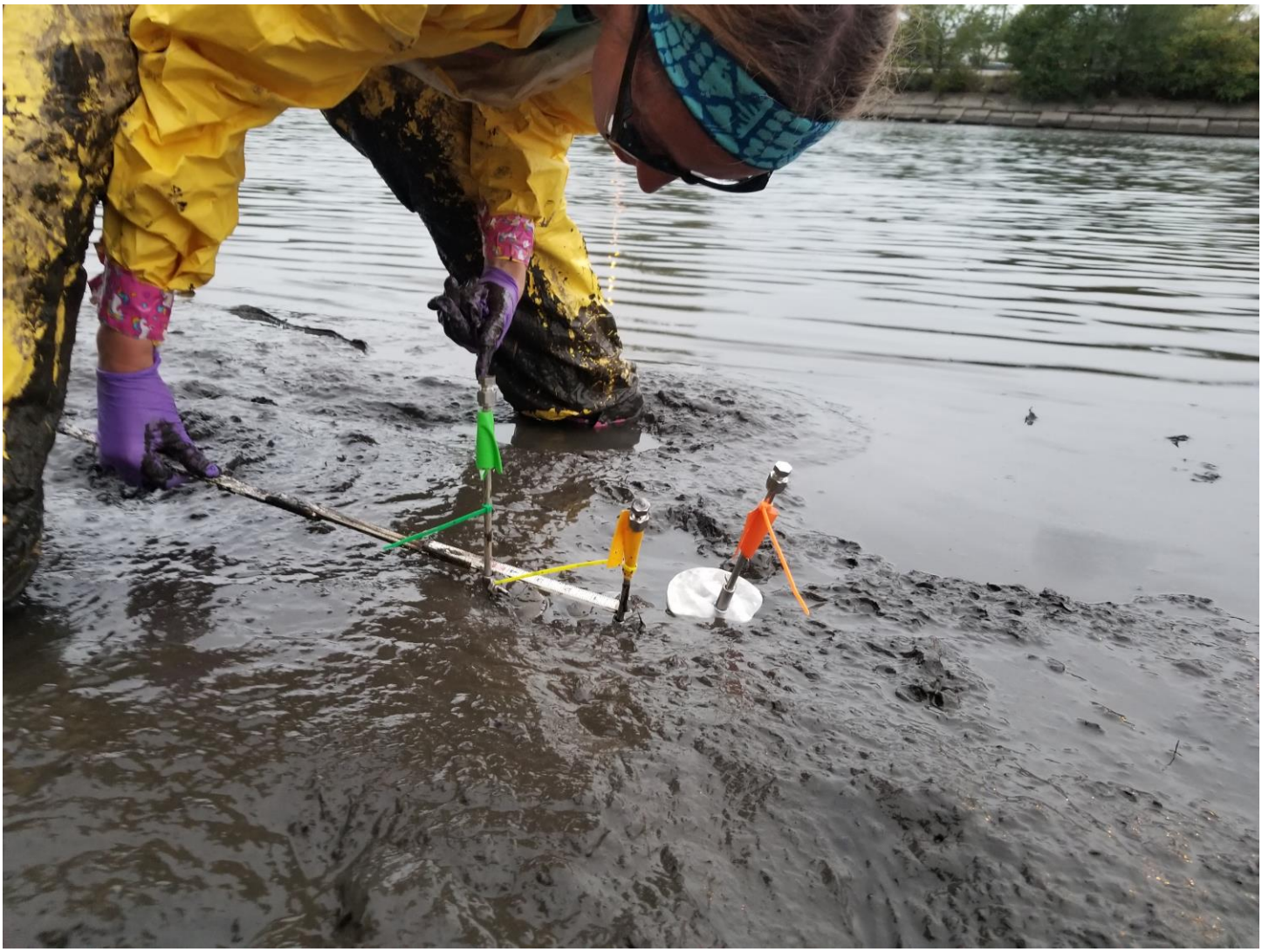
Photograph 10: Inserting the SPME sampler into the rod driven to the correct depth at Station 0604.

09/29/2019



Photograph 11: Three samplers deployed at Station 0604.

09/29/2019



Photograph 12: Measuring the distance between three samplers installed at Station 0602.

09/30/2019

Attachment 2
Field Logbook Notes

Location Rutherford, NJ Date 9/28/19

Project / Client LPR / USACE

RM 10.9 SPME

9 45 TG onsite @ Riverside County Park, Rutherford NJ, to meet with Keegan Roberts before oversight to discuss plan ahead.

Weather: 75°F, partly sunny.

PPE: Level D, Tyvek, PFD

Purpose: Provide oversight to SPME deployment on RM 10.9

10 00 TG and KR walk around site and discuss goals and expectations for this event. Site walk.

11 00 KR offsite. TG waiting for rest of crew from AECOM to arrive.

11 15 AECOM additional workers arrive at Riverside Park. Discussing plan for the day. AECOM crew takes site walk to observe the area.

11 45 TG meets up with AECOM crew. Water levels are still too high to begin work. Low tide is @ 15:30. Will hopefully be going out on the water by 13:30.

12 00 TG offsite to get lunch.

12 20 TG back onsite. AECOM crew is setting up field station.

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RM 10.9 SPME

AECOM crew checking/preparing all samplers to be used today. Still waiting for the tide to lower so SPME deployment can begin.

12 45 AECOM conducts tailgate meeting to go over plan for deploying SPMEs. and getting everything done as efficiently and safely as possible.

13 20 Finishing preparations for deployment TG gets rest of equipment from car to prepare to start oversight. AECOM will deploy SPMEs in 2 groups after doing the first one. Clare Hagan-Murphy (AECOM) begins suiting up to take GPS coordinates.

13 45 First deployment will be @ location 607. Sticking in rebar to gauge how deep the layers are. Depth to geotextile $10\frac{1}{4}$ in. depth to armor 5 in below surface No soft sediment in location, mostly sandy sediments.

13 55 REDO: depth to geotex: 11.5 in depth to armor: 8.5 in

Location Rutherford, NJ Date 9/28/19

Project / Client LPR / USACE

RM 10.9 SPME

soft sediment thickness: 2.5"
Took another set of measurements from new spot because of soft sediment deposit and GPS match. Underlying sediment @ 21.5"

1415 Begin deployment of SPME @ location 607. Surface SPME (to top of geotextile) length 25.75" Add DI water to Henry sampler, and metal ring to sit on sediment surface. Add washer cap to close off sampler from surface water. Color coordinated tape (green) added to the top of sampler.

1430 Begin deployment of next sampler. Active layer sampler: SPME length 26.75". Other group at this point breaks off and begins deploying SPMEs at location 606. TG will get measurements at a later time, will stay with first group for now. Struggling to bring rod to depth, hitting a rock. Upon dropping the SPME down the tube, sampler got stuck in the tube.

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Project / Client LPR / USACE

RM 10.9 SPME

1450 Will need to redeploy the SPME. Screen on the tip was slightly bent, making it hard for the SPME to pass through. Casing removed. end of sampler is ~6" below geotextile mat. * surface sample has 16" of sampler above sediment. Active layer sampler has 9.25" sampler above sediment. Round plate added, DI water added and washer cap added. Yellow tape added to ID sampler as active.

1505 Begin deployment of underlying sediment sampler (deepest one). Lower rod down to underlying sediment. Waiting for a sampler to be brought to us. Sampler length is 36" before deployment. Length of sampler sticking out is 7". Metal round plate, DI water, and washer cap added to sampler. All 3 samplers @ 607 installed. Deep sampler coded with orange tape.

1530 TG and AECOM group head to location 608 to install next group of SPMEs.

9/28/19 TG

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Project / Client LPR / USACE

RM 10.9 SPME

15[35]	AECOM cleaning of equipment to be used at the next location.
15[45]	Begin measurements @ 608. depth to geotextile mat: 14.5" no soft sediments here. depth of sand layer: 5". Armor layer starts after sand, 5"-14.5" is the armor layer. Begin preparations for deployment of armor sampler. Hammer rod down to depth. Underlying sediments begin @ 24.5", Length of sampler is 24". Length of sampler sticking out of ground is 9". DI water added, round metal plate added. Washer cap added. Green tape added.
16[00]	Begin deployment of active layer sampler. Length of sampler: 24". Length of sampler sticking out of the sand: 3.5" Add round metal plate, DI water, and washer cap. Yellow tape added.
16[20]	Begin development of underlying sediment sampler (deepest). Length of sampler: 36". Length of sampler sticking out of the sand: 2.5" DI water, round metal plate, and

Location Rutherford NJ Date 9/28/19

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RM 10.9 SPME

	washer cap added. Orange tape used to mark sampler. After capping the orange sampler, only a small amount (2.5") sticking out of group, something to keep an eye on.
16[35]	Will deploy duplicate samplers @ this location.
16[45]	After talking with Helen, duplicate is already being set up @ 606, so it will not be deployed here. TG heads to 606 to observe duplicate deployment.
17[00]	Crew @ location 606 finishing up deployment of duplicates. Will record all measurements of 606 SPMEs once they are finished. TG back at field set up in Riverside Park, decon'ing.
17[30]	Crew 2 from 606 back at field set up. TG records measurements. 606 parent samplers: soft sediment thickness: 10.75", Habitat sand: 6.75". Depth to armor: 17.5". Depth to geotextile mat: 18.25". Armor layer sampler: 24". Length out of ground: 6.25". Active layer sampler: 36". Length

Location Rutherford NJ Date 9/28/19

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RM 10.9 SPME

out of ground: 11". Underlying sediment sampler: 48". Length out of ground 13.75".

17[40] 606 duplicate: Soft sediment thickness 8.5". Habit sand layer thickness 8.5". Depth to armor 15". Depth to geotextile 20". Armor layer sampler: 25.75". Length out of ground 7". Active layer sampler: 36", Length out of ground 9.25". Sediment sampler 48", length out of ground: 8".

18[00] TG offsite, onsite tomorrow @ 1300.

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Location Rutherford NJ Date 9/29/19

Project / Client LPR / USACE

RM 10.9 SPME

12[30] TG onsite @ Riverside County Park.

Weather: 85°F, sunny

PPE: Level C, tyvek

Purpose: Oversight of AECOM's deployment of SPME samplers.

12[45] TG waiting for AECOM personnel to arrive onsite. Planned beginning of deployment @ 13:00.

13[00] AECOM crew onsite. Mobilize trucks toward locations 609/610. SPME deployment at these locations will require boat access; boat will be used today to deploy @ 609/610. AECOM setting up all deployment equipment on shore by the ramp. AECOM will have 2 groups performing deployments again today. One group on the boat at 609/610, and the other ~~be~~ crew downstream working from the shoreline. starting @ 605. TG will join the crew working from the shoreline to keep open room on the boat.

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RM 10.9 SPME

13[25] Still setting up equipment, water still too high to begin deployments. TG will record missed measurements from locations 609/610 at the end of the day. Low tide time: 16:40.

13[35] H+S meeting down on ramp. Slips/Falls, heat safety, boat safety. Goal today is to deploy 4 sampler's, and leave the final 3 for Monday afternoon.

14[00] TG and shoreline crew spotting access points and GPSing points to be sampled, still waiting for tide to lower to reveal points. Crew suiting up in waders and tyvek to take GPS points, getting samplers ready for use.

14[30] Clare Murphy-Hagan begins taking GPS coordinates of locations, while rest of crew waits at truck.

15[00] TG + AECOM suits on tyvek. About to head out to location to deploy. Cutting vents into back/armpits on tyvek to help prevent heat stroke

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RM 10.9 SPME

15[20] Arrive @ 605. Soft sediment: 0-7.25". Surface to armor: 0-8.25". Depth to geotextile: 22.5". Begin deployment of armor layer sampler. SPME length before deployment: 36". Length out of sediment: 16.25". Armor layer here is variable, thick in some spots, and thin in others. Add DI water to sampler, add round metal plate. Add washer cap and green tape for ID.

15[55] Begin deployment of active layer sampler, planning for 6" below geo-textile fabric. Length of SPME sampler: 36". Length of sampler out of sediment: 7". Add DI water to sampler, add round metal plate, and washer cap. Add yellow tap for ID.

16[15] Begin deployment of underlying sediment layer sampler: SPME sampler length is: 48". Length of sampler sticking out of sediment: 6.5". Added DI water, round metal plate, and washer cap. Marked with orange tape.

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RM 10.9 SPME

16^{40}	AECOM crew gathering supplies from truck before heading to next location. Location 604 will be deployed next.
17^{00}	Arrive @ 604. Depth to armor 15.25", Soft sediment thickness: 0-13.75". Depth to geotextile fabric: 21.75", Preparing to deploy armor layer sampler. SPME length: 24". Length of SPME sticking out of sediment: 4.5". Add DI water, round metal plate, and washer cap, Marked with green tape.
17^{15}	Begin deployment of active layer sampler. Length of sampler: 48" Length of sampler sticking out of sediment: 20". DI water, round metal plate, and washer cap added. Yellow tape added For ID.
17^{40}	Begin deployment of underlying sediment layer sampler. Length of sampler: 48". Length of sampler sticking out of sediment: NA ~~DI water, round metal plate, and washer cap added. Orange tape.~~

AF 9/29/19

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RM 10.9 SPME

17^{50}	Upon removal of the instalation rod, the sampler was only sticking out of the ground by ~1 cm. Will re-deploy this final sampler using new equipment.
18^{00}	Begin re-deployment. SPME sampler length: 48". Length of sampler sticking out of sediment: 10.25". Add DI water, round metal plate, and washer cap. Orange tape added.
18^{15}	AECOM and TG on shoreline. 604 all installed. Waiting for other AECOM crew to bring decon water to us before heading up to the truck.
18^{30}	Unable to record measurements from 609/610 because that crew was offsite. Will record them tomorrow.
19^{00}	TG offsite

AF 9/29/19

Rite in the Rain

Location Rutherford NJ Date 9/30/19

Project / Client LPR / USACE

RM 10.9 SPME

13^{30} TG arrive onsite.

Weather: 72°, overcast

PPE: Level C, tyvek

Purpose: Provide oversight on SPME final deployment @ 3 locations

13^{45} TG meet up with AECOM personell and discuss plans to complete today's SPME deployments. TG will get data from locations 609/610 from yesterday.

14^{00} AECOM + TG meet on shoreline near location 603, waiting for the tide to go out.

14^{05} 609 data: soft sediment thickness: thin, NA Habit: 0-8". Depth to armor: 8". Depth to geotextile: 13". Armor layer sampler: 11.25" below surface for bottom of sampler. Active layer: 6" below geotex (20" below topsoil) Sediment layer: 17" below geotex, (29" below surface).

610 data: 0-1" soft sediment. Depth to armor: 1". Depth to geotex: 9". Armor layer: 9" below

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top sediment. Active layer sampler: 6" below geotex, 15" below surface. Sediment layer: 18" below geotex, 27" below surface. All measurements listed above are measured to the bottom of the sampler.

14^{15} AECOM getting all samplers and equipment ready for deployment. Water still covering deployment points, waiting for tide to ~~recedd~~ recede, Will go out in 2 groups again to complete the final 3 deployment locations. Going over plan and getting set up at truck.

14^{40} H+S meeting given by AECOM. Being safe in the sediments, staying hydrated, rain/weather safety.

15^{15} Clare Murphy-Hagan suits up and heads to locations to get GPS coords.

15^{45} Water has receeded enough to begin deployment. AECOM + TG suiting up in waders/tyvek, preparing to begin SPME deployment. TG will head out with group to 603.

9/30/19 Rite in the Rain

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RM 10.9 SPME

16[00] Set up @ 603. Soft sediment thickness: 9.5". Depth to armor: 10". Thin layer of sand above armor. depth to geotextile fabric: ~~20"~~ .46 Picking out sample locations. Re-measured depth to geotextile: 17.5".

16[20] Begin deployment of armor layer sampler: Sampler length: 26.875" Length of sampler sticking out of sediment: 11". Add DI water, round metal plate and washer cap. Green tape added for ID.

16[40] Begin deployment of active layer sampler. Sampler length: 31.625". Length of sampler sticking out of sediment: 7.5" Round metal plate added. DI water added, washer cap added. Yellow tape added as ID.

16[47] Begin deployment of sediment layer sampler. Sampler length: 42.625". Length of sampler sticking out of ground: 5.25"

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RM 10.9 SPME

Round plate added, DI water added, washer cap added. Orange ID tape added.

17[05] Arrive @ 602. Soft sediment layer: 0-7.5". Depth to armor: NA GPS retaken and spot moved about 10' out to west. Soft sediment: 0-8.75", Depth to armor: 10.75". Depth to geotextile: 13.25".

17[20] Begin deployment of armor layer sampler. Sampler length: ~~20.5"~~ Length of sampler sticking out of ground: ~~6.5"~~ .46 ~~9.0"~~ 8". Round plate added, DI water and washer cap added. Green tape ID.

17[50] Begin deployment of active layer sampler. Sampler length: 30.125" Length of sampler sticking out of ground: 6". Sampler installed on a slight angle due to rock impedement. Using trig estimated that bottom of sampler is at . Round plate, DI water and

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RM 10.9 SPME

washer cap added. Yellow tape.

18[30] Begin deployment at underlying sediment layer. Sampler length: 40.25". Length of sampler sticking out of ground: 6.5". This one is also on a slight angle. DI water, round plate, and cap added. Orange top.

18[50] Back on shore. Deconned. TG to record 601 data.

19[05] ~~TG offsite~~. To record data upon arrival @ residence.

19[45] Data from 601: soft sediment thickness: 0-3.5". Habitat sand: 3.5-5.5". Depth to armor: 5.5". Depth to geotextile 11.5". Armor layer sampler length: 18.625", Length of sampler sticking out of ground 9.25". Active layer sampler length: 24.25". Length sticking out: 5". Sediment layer sampler length: 35.75". Length sticking out: 6.5".

9/30/19

Location: Rutherford NJ Date: 10/1/19

Project / Client: LPR / USACE

Diamond Alkali OU4 / CWCM

6[15] TG onsite @ 1 Madison St.

Weather: 80°, partly sunny

PPE: Level D

Purpose: Oversight of CWCM 19Q event

6[25] TG meets with OSI and Anchor QEA crew at dock loading up boat.

6[45] AECOM meets on dock. Personnel (OSI) Alexandra Allen, James Roth ~~(AECOM)~~ & Clare Murphy-Hagan, Mike Tatarelli (AECOM), Chris Yates (QEA), TG (COM Smith). H+S meeting given by Clare: hydration, boat safety, fatigue. TG will be aboard the boat with Anchor QEA.

6[55] Both boats depart from dock and head to RM 12.0 for first collection.

7[00] Arrive @ RM 12.0. OSI boat preparing for sampling, ties onto buoy. AECOM labels containers and OSI attaches tubing to YSI.

7[15] Vertical profile performed. WQ parameters recorded.

7[20] Samples collected from bottom of RM 12.0, flood tide.

10/1/19

Rite in the Rain